I. **Executive Summary**

Butte Creek Salmon and Steelhead Counting Station
California Department of Fish and Game, Region 2

b. Project description and primary biological/ecological objectives.

The goal of the project is to design and install a video monitoring system at the existing Parrott-Phelan Diversion Dam fish ladder. The system will allow accurate and timely enumeration of chinook salmon and steelhead trout as they ascend Butte Creek to spawn.

c. Approach/tasks/schedule

The project will take one year to complete and will be done in three stages. The first is the design, engineering, and acquisition of specialized electronic equipment. The second stage is the installation of the video monitoring system. The third stage, to be completed within one year of funding, is the implementation, calibration and operation of the system. A report summarizing the project will be completed within 15 months of the date of funding.

d. Justification for project and funding by CALFED

The video monitoring system will allow spring-run chinook salmon (SRCS) and steelhead trout (both are priority species under CALFED guidelines) to be counted with greater accuracy than the current method of snorkel survey. This system will also allow real-time determination of SRCS run size rather than the current several months delay before snorkel surveys can be done. Butte Creek steelhead trout run size can only be determined using a counter or video system and, therefore, will be able to be estimated for the first time.

There are many projects underway to improve salmon and steelhead populations in Butte Creek including fish screens, ladders and habitat improvements. This counting station will allow evaluation of the overall success of these projects as well as providing critical and timely information for water and fisheries managers in the watershed, mainstem Sacramento River and Delta.

e. Budget costs and third party impacts

The total cost of the project is $97,000 and will include design and construction of the system, purchase of equipment, and operation through May of 1999. Operation and maintenance of the equipment beyond May of 1999 will be funded through other California Department of Fish and Game (CDFG) funds.

The project site is owned by M & T Ranch of Chico and construction and operation of the equipment would require the ranch's permission. Since the CDFG has had permission for unlimited access for research and monitoring purposes for many years, it is not anticipated that there would be a difficulty obtaining permission from M & T Ranch. Modifications to the Parrott-Phelan fish ladder will be such that, when the equipment is removed, the ladder will function exactly as before construction.

f. Applicant qualifications

The Department of Fish and Game (CDFG) is the trustee agency for the State's fish and wildlife resources under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (43 Stat. 401, as amended; 16 U.S.C. 661 et seq.). CDFG, Region 2, has been monitoring chinook salmon and steelhead trout populations in the Butte Creek watershed for at least twenty-five years. CDFG ,Region 2, is also the lead agency in many past and current publicly-funded projects in the Butte Creek watershed and, hence, has extensive knowledge of the Butte Creek watershed's fisheries and wildlife resources.

g. Monitoring and data evaluation

The current monitoring method, snorkel survey, will continue at least for five years so that the snorkel survey and video monitoring methods can be compared and refined. Data will be peer-reviewed and reported once per calendar year. Preliminary reports will be available on a biweekly basis for use by water and fishery managers.

II. **Title page**

a. **Butte Creek Salmon and Steelhead Counting Station**

b. Names of applicant/principal investigators

California Department of Fish and Game, Region 2 Fisheries

c. Type of organization

State Agency

d. Tax identification number

Not Applicable

e. Technical and financial contact persons

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f. Participants

California Department of Fish and Game

g. RFP project group - Group 3 - Services

Project description

a. Project description and approach

The proposed project includes the design, construction, and calibration of an automatic underwater video monitoring system at the Parrott-Phelan fish ladder on Butte Creek near the city of Chico (**see map, Figure 1**). The system will allow spring-run chinook salmon (SRCS) and steelhead trout to be counted with greater accuracy than the current method of snorkel survey. This system will also allow real-time determination of SRCS adult run size and timing rather than the current several months delay before snorkel surveys can be done. Butte Creek steelhead trout run size can only be determined using a counting system and, therefore, will be able to be estimated for the first time. The project approach will be to modify the system design used by the U.S. Fish and Wildlife Service (USFWS) on the mainstem Sacramento River at Red Bluff. After a design has been refined and permission from the landowner has been obtained, construction will begin. Calibration and operation of the equipment will follow. Final design will be determined using input from the landowner, CDFG engineers, technical and scientific staff, USFWS personnel, and at least two private video monitoring specialists.

b. Location and/or geographic boundaries of the project

Butte Creek, Butte County, at the Parrott-Phelan diversion dam (also called 'Okie dam') (Figure 1).

c. Expected benefits: Accurate and timely determination of chinook salmon and steelhead rainbow trout run abundance and composition (adults and grilse) is critically important to understanding the status of these populations. A video system allows fish size and sex to be determined, allowing detailed understanding of these critical populations.

d. Background and biological/technical justification: A fish weir is proposed to be constructed at the top of the Parrott-Phelan fish ladder so that adult fish ascending the ladder must swim through a narrow, short, lighted tunnel in order to exit the ladder and continue upstream. A continuously-running waterproof video camera and lighting system mounted in the tunnel films the fish against a measuring device so that the fish's species, length, sex, condition, and other details can be observed. The camera records onto a commercial-quality video cassette recorder mounted in a waterproof and vandal-resistant case outside of the fish ladder. Playback requires a 'jog shuttle' playback system allowing clear fast-forward viewing and frame-by-frame viewing. With the equipment properly installed and calibrated, very clear images can be obtained. A technician can scan 24 hours of tape in approximately 3 hours, recording data on fish moving past the camera, upstream or downstream.

Studies performed by other researches on the Sacramento and Mokelumne River have shown that, if lighted tunnels are constructed to be no more than 1.5 meters in length, adult salmon and steelhead will not avoid entering the tunnel provided that the water beyond the tunnel is relatively dark.

e. The proposed project will require 12 months and will result in a state-of-the-art fish counting facility on Butte Creek that will allow accurate and timely determination of chinook salmon and steelhead trout population size and condition.

The project will include the following tasks:

1. The Parrott-Phelan fish ladder will be evaluated by CDFG engineers and private video monitoring specialists to determine the best method of installing a video system without compromising fish passage.

2. The engineering information will be incorporated into the design of the system. The video system currently used by the USFWS at the Red Bluff diversion dam on the mainstem Sacramento River has been preliminarily evaluated for use on Butte Creek. Any required modifications of the USFWS design discovered through evaluation by engineers and others will be included in the new design.

3. CDFG staff will purchase equipment and make modifications to the ladder.

4. The video equipment will be installed, tested, and calibrated.

5. The video equipment will be operated for one adult salmon migration period (February through June) to test the equipment and refine system operation.

6. Quarterly progress reports that include project and financial information will be prepared. A report summarizing the project will be prepared by CDFG after the one-year funding period is concluded.

f. Monitoring and Data Evaluation: Because this is a pilot fish counting project, monitoring and data evaluation is an integral part of the project. By comparing fish counts from the video system to counts obtained by snorkel survey, quality of the video system will be determined. All video tapes produced will be kept for at least one month and at least 20% of the data collection (tape viewing) will be verified by a second observer.

g. Implementability : Written permission of the landowner will be obtained before any work commences. All state and federal Endangered Species Act regulations regarding take of listed species (should spring-run chinook salmon and/or steelhead trout be listed in either Act) will be followed, either by internal consultation in the event of a state listing, or by obtaining a Section 10 Permit to Take Endangered Species in the event of a federal listing.

The project site will be monitored at least twice per day to insure that the video system is not interfering with the function of the ladder. No fish will be handled or delayed in any way from moving upstream to the spawning/holding areas of upper Butte Creek.

Costs and schedule to implement proposed project

Table 1. Butte Creek Counting Station Project Budget by Task

Task	Cost
1. Evaluation by CDFG Engineering staff	$0
2. Evaluation by Private Video Fish Monitoring Consultant	15,500
3. Design of the Video Monitoring System	12,000
4. Purchase of Electronic Equipment	30,000
5. Modification of the fish ladder	9,500
6. Installation and Testing of the System	8,000
7. Operation of the System for Four Months	20,000
8. Report Preparation	2,000
Total project budget	**$97,000**

Table 2. Butte Creek Project Budget by Expenditure Item

Expenditure item	Cost[1]
Professional services	$37,500

[1]All expenditure items include CDFG overhead of 26%

Construction Materials	$9,500
Electronic Equipment Purchase	$30,000
Temporary Personnel to Operation of the System	$20,000
Total Budget (overhead of 26% included)	**$97,000**

Table 3. Schedule of Butte Creek Counting Station Project Timetable

Task	Completion date 1/
1. Evaluation By CDFG Engineers	6/01/98
2. Evaluation by Private Video Monitoring Consultant	7/15/98
3. Design of the System	9/1/98
4. Purchase of Electronic Equipment	9/30/98
5. Modification of the Fish Ladder	9/30/98
6. Installation and Testing of the System	10/15/98
7. Operation of the System for Four Months	5/1/99
8. Report Preparation	6/01/99

1/ assumes a 6/01/98 project initiation

Applicant qualifications

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